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Quantum state tomography of dissociating molecules

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abstract Using tomographic reconstruction we determine the complete internuclear quantum state, represented by the Wigner function, of a dissociating I_2 molecule based on femtosecond time resolved position and momentum distributions of the atomic fragments. The experimental data are recorded by timed ionization of the photofragments with an intense 20 fs laser pulse. Our reconstruction method, which relies on Jaynes' maximum entropy principle, will also be applicable to time resolved position or momentum data obtained with other experimental techniques.